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OPTIMIZING EDUCATIONAL INVESTMENT STRATEGIES.

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THE DETERMINATION OF THE OPTIMUM DISTRIBUTION OF EDUCATIONAL INVESTMENTS IS A CURRENT AND ACUTE PROBLEM. EXAMINATION OF SEVERAL INTERRELATED PROBLEMS OF UNDERDEVELOPMENT IN ORDER TO CONSIDER THEIR PROGRAMMATIC IMPLICATIONS LEADS TO THE IDENTIFICATION OF GENERAL AREAS FOR EDUCATIONAL INVESTMENT EXPENDITURES. THE AREA OF MOST PERVASIVE NEED IS THE LANGUAGE ARTS, IN WHICH A NATIONAL PROGRAM WITH A SYSTEM OF SUPPLEMENTARY LEARNING CENTERS IS NEEDED TO OVERCOME BASIC DEVELOPMENTAL PROBLEMS. OTHER AREAS FOR WHICH SPECIFIC RECOMMENDATIONS ARE MADE ARE (1) AREAS OF UNDERINVESTMENT, (2) AREAS OF PREVIOUS PROGRAM FAILURES, (3) AREAS OF GREATEST POSSIBLE COST REDUCTION, AND (4) AREAS OF CRITICAL MANPOWER SHORTAGES. (DR)

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OPTIMIZING EDUCATIONAL INVESTMENT STRATEGIES

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Optimizing Educational Investment Strategies

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The Problem: Assuming that massive amounts of educational monies were available for interventions in human growth and development problems, what are the optimal investments we can make in terms of largest and most rapid payoffs? (Related problem: the fact that in this stage of cultural evolution we should even be asked the first question).

An Assumption: The spectrum of human growth and development problems ranges from pre-natal to geriatric and that this spectrum is also a scale of diminishing returns.

We can begin by listing some current problems of underdevelopment:

1. Children from disadvantaged families who are born with lower I.Q.s as a result of the lack of pre-natal care and the poor nutrition of slum mothers.
2. Culturally disadvantaged children who arrive at school lacking in academic skills and learning sets and who keep falling further behind until they finally drop out.
3. Culturally different children, such as Indians, Puerto Ricans, and Mexican-Americans, who are often illiterate in two languages.
4. Massive numbers of children with learning disorders, as a result of physical, psychological, or social impairment, who need, but who do not receive special compensatory education (see the appendix, "Developing the Variant Child," for gross estimates).

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5. Gifted children and children with normal I.Q.s who are underachieving.
6. Youths and adults almost totally lacking in job skills and in the basic education prerequisite to the attainment of such skills.
7. Motivated individuals, such as migrants and some inmates of correctional institutions, whose abilities could be upgraded with relative ease with the proper intervention.
8. Families, including unwed mothers who lack rudimentary coping skills and who, as a consequence, are subject to either chronic or periodic dependency.
9. Large numbers of students who are capable of doing college work but who either lack the opportunity to enter college, or, after they succeed in entering, dropout.
10. Substantial numbers of teachers whose intellectual and cultural levels is low and who have been inadequately prepared for teaching.

There are some other developmental problems, requiring educational investment particularly those in the manpower area, which cut through the constraints (i.e., largest and most rapid payoffs) mentioned above. In some cases technology will be an alternative where personnel shortages exist; in other cases we will have to invest more heavily in the training of teachers' (e.g. increasing the budget of the National Teacher Corps) and in the training of aides, technicians and educators so as to be able to multiply the

effectiveness of existing teachers and to accomodate more of the needs of the learners.

The problems listed above, obviously, have programmatic implications in terms of devising optimal educational investment strategies. Assuming massive funds to be available, a sizable portion, perhaps 50%, will still have to be allocated to sustain existing incompetence so as to prevent major system breakdowns or further adulation of effort. The remaining funds available can be invested according to priorities and necessary sequences determined by an examination of the programmatic implications of the problems that have been listed.

1. Pre-natal intervention. Recent research results from South Africa and the United States indicate that various forms of impairments can be prevented through adequate pre-natal care and that the I.Q.s of the offspring of colored slum mothers can be raised 5 points when these mothers are administered iron and vitamin B during the last half of pregnancy. The payoff here is rapid and the cost is small, particularly when compared to the value of 5 additional I.Q. points over a lifetime.
2. The culturally disadvantaged. Given the success of pre-Great Society programs, such as cognitive development in nursery schools, and anti-poverty programs, such as Head Start, the point no longer requires argumentation that we can immunize against academic retardation. We have found that young learners (2.5 to 5 years of age) are responsive to even slight amounts of educational stimulation and that they learn beautifully under appropriate circumstances. Foremost among these appropriate circumstances are "Talking Typewriter" Learning Centers, which contain sophisticated instrumentation and space

for group and individual tutorial activities, *In these centers* children of all ages have progressed in reading from zero, to several years above grade level, with corresponding positive changes in attitude and behavior. To insure that these gains will be preserved, it is necessary to further immunize against the toxic effects that many schools have on certain kinds of children by providing programs such as Follow Through and by providing learning and activity centers in parallel to conventional school facilities.

3. The culturally different in whom English is not endemic. The language barrier for these learners has proven to be almost as formidable as for students with learning disorders. The language arts helplessness of these linguistic aliens dooms them to gross underdevelopment and forbids their entrance to the opportunity structure of our culture and economy. The measure of their stunted growth is their level of academic achievement. The average Indian, for example, has an achievement level of fifth grade, which is to say, the average Indian is a functional illiterate. And if the Indian, the Puerto Rican, the Mexican-American happens to be a member of a family of migratory workers, his average level of educational achievement is fourth grade. Small progress has been made in recent years in programs which permit the child to use his natural verbal language and which teach English as a foreign language. However, if these approaches can be used in concert with a multi-sensory invasion of the learner's sensors, such as in the learning centers mentioned earlier, that could well prove to be the combination which will unlock the developmental doors to growth, opportunity, and self-realization. To be sure, there remain sub-cultural characteristics strongly resistive to assimilation.

If done correctly, though, the learning center -- with its technology, its curriculae, and its supportive programs -- can enable the learner to adapt to the dominant cultural mode while, at the same time, preserve the sub-cultural values that are most highly prized and respected by these learners.

4. Disabled learners. There are many millions of learners who suffer from one or more forms of physical, social or psychological impairment which result in severe impediments to learning. These include personality damage and variant life styles as a result of living in poverty; neurological impairment; emotional disturbance; mental retardation; visual, hearing, and speech defects; chronic diseases; paralysis and orthopedic impairment; etc. Millions of these children are functioning grossly below their ability levels, particularly in the area of language arts, including, by the way, the mentally retarded. (aside: we have found that educational technology, particularly the "Talking Typewriter," makes it possible for learners to become categorically transformational -- that is, a child diagnosed as "mentally retarded, trainable" becomes, by virtue of technology, a child who is "mentally retarded, educable." We are not restricted to this portion of the ability spectrum. Educational technology makes possible "quantum jumping" across the entire ability spectrum. The problem of the retrograde condition of disabled learners, as with the culturally disadvantaged and the linguistically different -- with particular reference to the language arts -- is twofold: i) the average elementary school teacher has had only 2.5 semester hours of preparation in the teaching of reading (a practically valueless commodity in view of the ghastly courses); and ii) until comparatively recently, the technology that

would enable massive gains in language arts proficiency did not exist. We can now state without @pprobrium, that on the latter score we can solve, with relative ease, the language arts problem of not only disabled learners, but also those of the linguistically different and the culturally disadvantaged. One vehiclular configuration we have developed is the concept of the Language Arts Suite. The Language Arts Suite is a learning center which features batteries of "Talking Typewriters," and a host of other devices: gang listening stations, dial access equipment, calculators, telelecture equipment, 8 mm single concept devices, and instruments such as the "Talking Page," and the "Talking Pointer." In addition the Language Arts Suite would contain a material center (a repository of curricular materials to be checked out on an as-needed and as-wanted basis by learners) a media production center, a micro-library (featuring paperbacks that are relevant as to race, sex, culture, age) and a micro-theater (a viewing room using films that are either aesthetic or vocationally oriented). In addition, of course, other rooms in the Suite would be reserved for special activities, for counseling, case conferences, recreation, etc.

Given the severity and pervasiveness of the language arts problems of these 3 groups - the culturally disadvantaged, the culturally different, and children whose impairments encumber them with learning disorders - and given also the fact that proficiency in the language arts is the first threshold that must be crossed before any other meaningful development can take place, it is likely that a proliferation of learning centers and Language Arts Suites will be required.

Moreover, they will have to be geographically diffuse, much the way gasoline stations are distributed, so that maximum numbers of learners can be reached and served.

Lastly, if we expand the concept of these Centers and Suites to include treatment of the total child, we would be afforded the opportunity of advancing the state of the art of diagnosis, early identification, and educational prognosis. Growth and development centers with capabilities in medicine, psychology, and social work, could offer pre- and post-natal care to mothers, nutritional services, and a program that would link problem individuals and families with the services of existing agencies.

5. Gifted and normal underachievers. The problem of underachievement is akin to the failure of one to extract all the gold possible from one's own gold mine. At present we are not able to attach a precise dollar value to either each I.Q. point or total I.Q. score. Much less are we able to quantify the penalty payments inherent in the failure of a learner to perform at his ability level. All we have been able to do at this point is to establish correlations between level of educational achievement and lifetime earnings. However, this does not help us with the dual problem of underachievement: the elimination of waste (e.g., a gifted student can complete college and still be performing well below his ability level) and the identification and cultivation of academic talent made mandatory by the higher educational requirements of our scientific and technological society.

The alleviation of this aspect of human underdevelopment might require legislation extending some of the programs of the National Defense Education Act. This would involve more precise measures of ability levels; more attention, in measuring or grading,

to the child as his own bench mark (rather than the group totem pole); the creation of techniques to identify the causes of developmental gaps; the design of special programs, either in-school or out-of school, especially those of an incentive nature; programs that will increase opportunities, such as numbers of fellowships and scholarships, in-school project stipends, and summer work stipends in the area of career choice. It should be added here, again, that the manpower concerns of our economy could figure importantly in the direction of programs which address the problem of underachievement. Lastly, to add the perspective of the preciousness of human resources, we should recall some facts about I.Q. distribution among mankind: only 5% of the human race has I.Q.s above 120 and only 1% have I.Q.s above 140.

6. Youths and adults lacking in job skills and in the basic education requisite to the attainment of job skills. It would be well for us to continue to operate a number of present training programs such as the Neighborhood Youth Corps, the Opportunities Industrialization Centers, the Nelson-Scheuer programs, OPT and other MDTA programs. However, it is clear in all these programs that the common failing is in the area of basic education. The failure here is compound in the sense that minimal gains in basic education tend to minimize training successes and they tend to minimize vertical mobility potential in individuals considered trained and placed. The learning centers and Language Arts Suites mentioned earlier could play an important part in constituting an activity that could significantly decrease the attrition in the major "loss point" in many training programs, that which occurs between registration and intake, and they could provide the incremental "hedge" that optimizes training success and post-training vertical mobility. The "built-in success" in basic education should be a primary constraint with regard to the continuance of future development of training programs.

With regard to residential training programs, it is apparent that the cost and effectiveness parameters of large residential training programs, such as the Job Corps, are highly questionable. Basically the concept of residential training programs is a sound one, since more controls are operative in residential settings. However, our past experience leads us to two unescapable conclusions: for reasons of cost, residential training programs should be community-based; and for reasons of effectiveness, they should be tied absolutely to ecological manpower needs. The programmatic implication here is clear: we need a Special Purpose Job Corps Center, based in the community of the Corpsmen, but tailored to the critical manpower shortage of a region or ecology, with a prior guarantee, both of placement, and placement in the job the trainee was prepared to enter.

Another attractive program measure would be to make "being in development" a condition of typically palliative programs such as welfare. The cost of investment here is inversely offset by the staggering costs of subsistence - level programs in which, at least as presently conceived, there is no potential or hope for individual betterment. In fact, in these programs, there is an inherent tendency for individuals and families to become chronically dependent.

7. Motivated individuals who are underdeveloped. Like investors in search of stock with good growth potential, we should, as public investors or investors in human capital, strive to create the human growth and development analog to the securities analyst so that we can identify those amongst us who are often incorrectly categorized as liabilities, but who may indeed be unrecognized assets, and thus, treated accordingly. We would single out for special mention here substantial numbers of migratory workers, who are strongly motivated to work, but whose efforts often yield them less than families on welfare, so that even working their incomes place them well below the index of poverty.

We would also advocate the selection of inmates of correctional institutions as an intervention population. We admit that many adult inmates of so-called correctional institutions are of dubious intelligence and ability. On the other hand we must remark the prodigious learning feats of substantial numbers of inmates whose talents could be fruitfully applied not only to pressing problems of society at large but also to the problems of custody and correction in our culture. In addition we could also single out large numbers (i.e., 90%) of delinquents who are of normal or higher intelligence and ability who could, along with the rest of us, profit from lesser expenditures on custody and increased investments in correction, which is to say, development. The thing we should remember here is that the deviance which leads to incarceration is also often a sign of energy and protest on the part of an individual who, perhaps genuinely, feels he is either "locked out" of the existing opportunity structure or who feels he cannot beat "the system." If we can shift our thinking from "liability" to "asset," from "custody" to "development," we can save the lives of many who would be chronically deviant and unproductive and we can save ourselves millions of dollars of the costs of institutional "care."

Lastly, we would include large numbers of underemployed and marginally employed individuals. At present we have pitifully poor techniques for identifying and measuring them, let alone techniques for upgrading them once they have been identified and measured. The task here will be to build on the techniques of skill assessment and upgrading developed in the military, where individuals can be maintained in postures of continual development. A major area of effort will, obviously, involve an analysis of job descriptions which appear to be a leading villain of the piece. The unreality of job descriptions staggers the mind, both at the momental irrelevance and at their function of ritual-as-social-control which perpetuates the status quo. At the risk of redundancy,

we should restate the implicit, namely: the problem of the underemployed and marginally employed is often closely associated with the problems of both the strongly motivated and the underachievers.

8. Families lacking in coping skills. It has been pointed out (see the Morristown proposal) that the relationship between Federal, and even state and local agencies, for that matter, is largely one of negativeism or indifference on the part of agencies. The only exceptions to this are the extension services of agricultural agencies. What is needed is an urban service program that would provide already developed curricular materials, in the area of family life education, to individual disadvantaged homes. The delivery system would consist of trained cadres of community aides based either in local CAP agencies or in existing community service agencies. This program could be buttressed effectively with a dial access system in which tape cartridges would be stored information having to do with the daily problems of disadvantaged families. It would also be useful to extend the family life curriculum program into the schools, particularly the ghetto schools as a preventive to such problems as illegitimacy, inefficient consumership, and the like. By getting involved with individual families and by helping them to acquire better coping skills it is anticipated that the costs of chronic or incidental dependency and other large social costs could be significantly reduced.
9. The college-able student. The achievement needs of under-opportunitied students and the manpower requirements of our economy are important factors which dictate that we give much attention to the area of higher education. Estimates of the number of students who drop out of our 2000-odd institutions of higher education range from 40% to 60% (although follow-up studies indicate that eventually some of these students complete their degree); the estimate of the number of Negroes dropping out of Negro institutions is 70%.

Chief among the reasons for the dropout rates, particularly as they involve students of minority-group or low-income families, are the following:

1. Basic language arts problems, especially reading retardation.
2. The curriculae of institutions of higher learning are perceived as irrelevant.
3. The students fail to experience requisite amounts of success experience.
4. Financial difficulties are often insurmountable.

These reasons suggest that several programmatic steps should be taken. College-able youths, such as Upward Bound candidates, for example, who have been inadequately prepared to compete in the arena of higher education could also benefit from the remediation that could be offered in the learning centers mentioned earlier. Secondly, relevance could be obtained through the creation of new degree programs (e.g., Applied American Studies, Social Engineering) and buttressed with work-study and other supportive programs. The programs suggested thus far should lead to increased success experiences. Lastly - and in addition to expanded expenditures for work-study programs and for student loans and scholarships - we invest much more heavily in the creation of community/junior colleges. Arguments for this are as follows: the community college aids in reducing the problems of assimilation, they are attractive from a cost point of view (the cost per student per year being on the order of \$500) and since they are community-based they reduce certain other costs (e.g., transportation) that normally accrue to students.

10. Teachers who are ineffective as a result of inherent limitations and/or poor preparation. It is a fact of some notoriety that our schools of education manifest the propensity for attracting less able students (although other factors are operative, such as salary scales) and then giving them a watered-down or inappropriate curriculum. However, the prospect of a change in this situation in the foreseeable future approaches zero probability -- the forces of inertia are enormous and it will take time and much leverage to move them even a little.

Nevertheless, certain small measures can be taken which can lead to small changes, which, in turn, can eventually lead to larger changes. For example, we can urge that funds be made available for in-service training programs and for formal seminars for teacher re-education. The underlying assumption of this program is that we are not going to make teachers over completely. Instead, we begin by recognizing the limitations of teachers and mediating these limitations through re-education and the stimulation of professional growth. Another important measure with regard to effecting changes in teacher attitudes and teaching techniques would be to encourage the development of leverage programs, such as the National Teacher Corps (the creation of performance models), increased use of educational aides and other "uncertified" personnel (the hope being to drive a wedge into the system), and increased support for a National Assessment (which may produce significant pressures for better performance).

* * * * *

The preceding list of programmatic suggestions rose naturally from the set of problems we perceived. Much of what has been presented is a shifting of the emphasis and dollar concentrations of programs we are already trying. Thus, several other questions arise -- How do we rank the suggested programs? How do we establish priorities? Which problem populations are we prepared to write off? How do we reduce the list

of suggested programs to the point where it is no longer reducible? What kind of "mix" should we have between low-cost programs of early intervention and more costly programs designed to reduce staggering social costs (e.g., crime, at least part of which stems from lack of education and opportunity, costs us \$27 billion a year)?

The following table is a useful input to our thinking about some of these questions:

1. The strategy of the economics of intervention. A primary consideration is implicit costs and how they escalate as the adjustment problems of individuals worsen. What follows, is, in effect, a sliding scale:

<u>Developmental Programs</u>	<u>Cost/Individual/Year</u>
Pre-school	\$ 200-500
Public school (average child)	450-750
Public school remedial (additional)	200-1000
Community College	500-1000
Non-residential youth employment	500-2500
Community-based service	2000*
4-Year College	2000-4000
Job Corps (projected costs after tool-up)	5000-8000
Berkshire Farms (problem youths)	5800-6400
Wyltwick (hostile, alienated youths)	8500-11000
<u>Non-Developmental Programs</u>	
Public Welfare	2500
Correctional Institution**	3800
Criminal Apprehension and court process	25000

* The range of costs for community-based services programs runs from \$20 to \$9000. An average cost is difficult to arrive at because of the variability of services and the intensity and duration of services. A Family Service type program involving one interview would cost only \$20 and for a limited number of interviews would cost perhaps \$60/family/year. Programs like Synanon and psychological clinics would be in the \$1000-\$1600 range; foster care programs would cost around \$3500; and intense psychiatric treatment programs which include a number of supporting programs would cost as much as \$8000 or \$9000.

** Lifetime custodial costs (prison, mental institution, etc.) are computed as ranging from \$100,000 to in excess of \$150,000.

Recommendations

Based mainly, though not totally, on the foregoing discussion, we are compelled by the argumentation to make a series of recommendations regarding educational investment expenditures. These are broken out into several different "areas" and are as follows:

I - The Area of Most Pervasive Need.

Recommendation #1: That we invest substantially in a National Language Arts Program (with the emphasis on reading) by establishing a nation-wide system of supplementing learning centers that would focus on early learning, remediation, acceleration, and basic education so that we can optimize our chance of winning the primary developmental battle. The National Language Arts Program would involve an age spectrum ranging from 2-5 years of age to adults.

II- The Areas of Underinvestment.

Recommendation #2: That we increase the size of our investments in total child development by establishing centers or components that cater to the medical, psychological, and nutritional needs of children as well as the educational needs.

Recommendation #3: That we devote increasing attention to the needs of gifted children and children of normal intelligence who are underachieving. Many of these children tend to be forgotten, given our present emphasis on educational disadvantage - and along with them, our commitment to the cultivation of academic talent in all its diverse forms.

Recommendation #4: That we increase appropriations aimed at early identification, diagnosis, and educational prognosis for the benefit of the millions of learners suffering from one or more forms of social, psychological, or physical impairment that produce significant learning disorders. The number of disabled learners is several orders of magnitude higher than is generally believed.

III - The Areas of Previous Program Failures.

Recommendation #5: That we intensify our efforts to fund programs on behalf of those groups that have remained relatively untouched since the implementation of the Economic Opportunity Act, the Elementary and Secondary Education Act, and other Federal legislation. Chief among these groups are Indians, Mexican-Americans, Puerto Ricans, and the residents of the core of the ghettos who escape even Bureau of Census detection.

Recommendation #6: That we confront our past failures in occupational training by facing up to, with adequate funds, the problem of providing effective basic education for dropouts, adult illiterates, and the marginally and underemployed. The millions of dollars poured into training programs turn out to be nothing but waste if we fail to provide requisite foundations for skill acquisition and skill up-grading.

Recommendation #7: That we increase the scope and intensity of our efforts on behalf of migrants and seasonal agricultural workers.

These groups represent a profound contradiction in the free enterprise systems, for to be motivated to work - hard work - and to learn less than many people on welfare is both an intolerable anachronism and a foundation crying to be built upon. The migrants and the seasonal agricultural workers, of all the people in our country, are the most lacking in terms of constituency and influences and as a result are the most exploited, most down-trodden, and most invisible of all our poor and disadvantaged.

IV - Areas of Greatest Possible Cost Reduction

Recommendation #8: That we make "being in a posture of development" a condition of being on welfare for all able bodied recipients. The costs of welfare, both in terms of cash and other payments to recipients and the costs of administering the program (20% of the total) are staggering and modest investments that result in self-sufficiency and productively (a phrase currently in vogue is, "converting them from tax users to tax payers") produce handsome returns not only to the GNP but also to the sense of dignity and worth of the individuals involved.

Recommendation #9: That we increase our allocations to institutional populations (especially the mentally retarded, the emotionally disturbed, the other-health-handicapped, and the population of offenders in correctional institutions.) Our "custody orientation" as a civilization has resulted in our incurring severe penalty payments (i.e., \$100,000-\$200,000 per individual institutional lifetime) as a result of our unenlightenment. We now know that new

behavior techniques, new technology, and new chemo-therapy techniques (some in combination) that we can drastically shorten incarceration, that we can remediate the heretofore irremediable, and that there are alternative techniques (e.g. community-based treatment) which are cheaper and more efficacious.

V - Areas of Critical Manpower Shortages.

Recommendation #10: That we intervene, with planned increments of expenditures, in the area of immediately critical or anticipated manpower shortages. While we recognize that an economy can run beautifully on fiscal deficits, we are also forced with the certainty that running our economy on manpower deficits particularly with the lead-time phenomenon, can be ruinous. To forestall massive system breakdowns, it will be necessary to identify large numbers of collegeable youths and to enroll them in professional training sequences in the areas of teaching, nursing, and social work - to name only the 3 areas of most critical shortages. Following quickly on the heels of these are physicians, scientists, and engineers and the myriad numbers of professionals and para-professionals dictated by the new needs of the Great Society Programs. Keeping an eye on accumulating manpower deficits and doing something about them is a planning imperative.

VI - Supplementary Recommendations. (and these come in the form of additional warnings).

Recommendation #11: That we expend additional funds on improving the state of the art of evaluation through the establishment of evaluation laboratories. To the disgrace of behavioral scientists,

it must be said that we don't know know, with quantifiable precision, how to evaluate program effectiveness. To be sure we have numerous evaluative schemes - involving time series, net impact, matched cohorts, longitudinal studies, and the like - but when all is said and done, we only have a very poor group^{asp} of not only the accuracy of measurement but of what actually has been measured. Obviously, it would be folly to continue to expend large sums of money when we have no way of getting at the effectiveness of the programs that have been funded.

Recommendation #12: That we pay increased attention to the parameters dictated by actual and projected demographic data. A particular danger point involves young workers (14-24) in the labor force. In 1960 they numbered almost 12 million and it is projected that in 1970 they will number almost 20 million and in 1980 they will number almost 24 million. If past patterns of education continue - and this against a background of higher and higher education and skill requirements, perhaps 30% will not have completed high school, and of that number, 10% will not have completed grade school. This constitutes an explosive force of millions of young people without adequate education and in many cases, zero skill. This is an exigency which must be prepared for.